

EXECUTIVE SUMMARY

Camp Lejeune began sampling its drinking water system in 1980 in advance of Safe Drinking Water Act (SDWA) regulations that would set limits for total trihalomethanes (TTHMs) in drinking water. TTHMs are disinfection byproducts of the chlorination process that were suspected of causing cancer. In October 1980, laboratory analyses for TTHMs indicated the presence of volatile organic compounds (VOCs) other than TTHMs in Camp Lejeune's Hadnot Point drinking water system. Additional TTHM analyses in 1981 also indicated the presence of VOCs at Hadnot Point. In August 1982, analyses of samples from the Hadnot Point and Tarawa Terrace drinking water systems identified varying concentrations of specific VOCs — trichloroethylene (TCE) and tetrachloroethylene (PCE). TCE is a degreaser that was widely used in equipment maintenance, and PCE is commonly used in dry-cleaning operations.

The Marine Corps conducted systematic sampling of drinking water wells at Camp Lejeune in 1984 as part of a new Navy environmental program. This sampling identified VOCs in the drinking water at some locations and lead Camp Lejeune to close ten wells in late 1984 and early 1985. To establish a historical record of events and decisions associated with Camp Lejeune's water contamination issue and take into account the concerns of former base residents who believe they or their family members have experienced adverse health effects from exposure to VOCs in the water, the Marine Corps is focusing its efforts on two questions:

1. Who was exposed to VOCs, and what are the health effects resulting from those exposures?
2. Did the Marine Corps take appropriate actions between 1980, when VOCs were first identified in the base's Hadnot Point drinking water system, and 1985, when the wells were closed?

To answer question 2 and determine if Camp Lejeune leadership took appropriate actions, the Marine Corps established the Drinking Water Fact-Finding Panel for Camp Lejeune (the Panel). This report describes the Panel's efforts between April 1 and September 30, 2004, and its findings. The Panel reviewed primarily information from the 1980–1985 timeframe; however it was not precluded from reviewing information from outside this time period. The Panel was neither chartered nor qualified to investigate claims of health effects of VOCs on former Camp Lejeune residents who consumed contaminated water and, therefore, makes no judgments about such claims.

To address question 1, the Marine Corps is supporting the Agency for Toxic Substances and Disease Registry (ATSDR) by providing information for an ongoing epidemiological study.

The Panel initially consisted of three core members but was subsequently expanded to include two panelists having specific scientific and water engineering expertise. The Panel has combined expertise in the operation and management of military facilities, the policies and operations of water treatment and distribution systems, the analytical procedures of water testing laboratories, and chemical toxicology. Booz Allen Hamilton, a management and technical consulting firm, was retained to provide administrative, logistical, and research support to the Panel. The Panel's charter and summary biographies on the Panelists are provided in Attachments A and B, respectively.

The Panel fulfilled its objectives by following several interdependent courses of action: document reviews, personal interviews, solicitation of comments from former residents, literature reviews, and utilization of the Panelists' expertise. Section 1 describes each course of action.

Based on its review and analysis of available information, the Panel found that the situation at Camp Lejeune occurred from a convergence of multiple factors (further elaboration on these factors can be found in Section 3.4):

1. During the period reviewed by the Panel, Camp Lejeune provided drinking water at a level of quality consistent with general water industry practices in light of the evolving regulatory requirements at the time.
2. Camp Lejeune made every effort to comply with existing water quality regulations and related schedules but did not anticipate or independently evaluate health risks associated with chemicals that might be subject to future regulation. In 1980 there was developing concern about potential adverse health effects from exposure to TCE and PCE, and the U.S. Environmental Protection Agency was just beginning to move toward establishing standards by issuing "suggested no-adverse response levels" for these chemicals.
3. Confounding factors that appear to have hindered Camp Lejeune personnel from quickly recognizing the significance of VOC contamination include the following: the absence of regulatory standards, no records of resident complaints about water quality, sampling errors, and inconsistent sampling results of tap water attributable to a multiple-well system that diluted or masked evidence of significant contamination from any one source.

4. Naval Facilities Engineering Command Atlantic Division (LANTDIV), as a technical advisory organization, apparently was not aggressive in providing Camp Lejeune's Environmental Division with the technical expertise necessary to understand the significance of the VOCs and how they could have been addressed.
5. Inadequate funding, staffing, and training of Camp Lejeune's Environmental Division, combined with the Division's compliance-based approach to regulations, contributed to a lack of understanding about the potential significance of the VOCs identified in the groundwater in the early 1980s.
6. Communications among Camp Lejeune's water system operators, the base's Preventive Medicine Department, the Environmental Division, and LANTDIV were inadequate.
7. Communications to Camp Lejeune residents regarding drinking water contamination were not detailed enough to fully characterize the contaminant levels found at the time of the well closures.
8. The Panel found the Marine Corps leadership acted responsibly and saw no evidence of Marine Corps attempts to cover up information that indicated contamination in Camp Lejeune drinking water.

In concluding its charter, the Panel encourages the following:

- The Marine Corps should upgrade environmental and risk communications training provided to base leadership and staff to assure that any future environmental issues are handled more precisely and promptly. The Marine Corps should also be more proactive in following environmental regulation development and water industry practices and provide periodic summaries of new issues to base water supply and environmental staff.
- The Marine Corps should make the information collected by the Panel available to the public.
- The ATSDR should expedite its epidemiological study of possible health effects from contaminated drinking water at Camp Lejeune.